(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 January 2001 (04.01.2001)

PCT

(10) International Publication Number
WO 01/00782 A1

(51) International Patent Classification[7]: C11D 17/04, 3/43

(21) International Application Number: PCT/US00/17008

(22) International Filing Date: 20 June 2000 (20.06.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
99870131.2 25 June 1999 (25.06.1999) EP

(71) Applicant *(for all designated States except US)*: **THE PROCTER & GAMBLE COMPANY** [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **EVERS, Marc, Francois, Theophile** [BE/BE]; Lakensestraat 37, B-1853 Stombeek-Bever (BE). **GALVAGNO, Laura** [IT/IT]; Via Cutigliano, 65, I-00146 Roma (IT).

(74) Agents: **REED, T., David et al.**; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217-1087 (US).

(81) Designated States *(national)*: AE, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/00782 A1

(54) Title: HARD SURFACE CLEANING WET WIPE

(57) Abstract: The present invention relates to a wet wipe for wiping various surfaces, preferably hard surfaces, incorporating a cleaning composition comprising a 2-alkyl alkanol and a solvent or a mixture thereof.

HARD SURFACE CLEANING WET WIPE

Field of the Invention

The present invention relates to a wet wipe, in particular to a wet wipe for hard surface cleaning. The wet wipe incorporates a cleaning composition comprising a 2-alkyl alkanol and a solvent or a mixture thereof. A wet wipe according to the present invention was found to exhibit a streak-free cleaning and/or a cleaning performance benefit.

Background of the Invention

Wet wipes are typically pre-moistened, disposable towelettes which may be utilised in a variety of applications both domestic and industrial and perform a variety of functions. Wet wipes are typically used to wipe surfaces both animate and inanimate, and may provide numerous benefits such as cleaning, cleansing, disinfecting, and skin care benefits.

One particular application for wet wipes is wiping and or cleaning hard surfaces and the application of compositions to hard surfaces, for example kitchen and bathroom surfaces, eyeglasses, shoes and surfaces which require cleaning in industry for example surfaces of machinery or automobiles.

Wet wipes incorporating a cleaning composition are already known in the art. For example, WO 89/05114 discloses disposable wipes for hard surface cleaning which are impregnated with a liquid composition.

Amongst the cleaning compositions available to be incorporated in a wet wipe, those relying on high levels of solvents, such as ethanol and other short chain monohydric alcohols, are often preferred, mainly due to the fast evaporation of said cleaning composition once it is applied onto the surface to be cleaned.

However, a drawback associated with the use of wet wipes incorporating a high level of solvents-containing cleaning composition, e.g., ethanol-based compositions, is that there are some limitations to the convenience, especially regarding the insufficient wetting capabilities, of said wet wipes. Insufficient wetting means that the cleaning composition forms single droplets on a surface, instead of a film, when applied thereon and/or forms droplets on said surface during drying, resulting in a reduced cleaning performance and/or visible residues (streaks) after drying. In particular, the wetting capability and, thus the streak-free cleaning and/or the cleaning performance of said wet wipes incorporating a cleaning composition may be improved.

Thus, the objective of the present invention is to provide a wet wipe incorporating a cleaning composition showing wetting capabilities and, thus a streak-free cleaning benefit and/or a cleaning performance benefit on a wide range of stains and surfaces whilst delivering an evaporation benefit.

It has now been found that this objective can be met by a wet wipe incorporating a cleaning composition comprising a 2-alkyl alkanol and a solvent or a mixture thereof.

Advantageously, the wet wipe herein may be used to clean hard-surfaces made of a variety of materials like glazed and non-glazed ceramic tiles, vinyl, no-wax vinyl, linoleum, melamine, glass, plastics, plastified wood.

A further advantage of the present invention is that the excellent cleaning performance is obtained on different types of stains and soils, including greasy stains, as well as particulate stains, especially particulate greasy stains, greasy soap scum and enzymatic stains.

Background art

WO 89/05114 discloses disposable impregnated wipes for cleaning hard surfaces impregnated with an aqueous composition comprising at least one water-miscible solvent. However, a wet wipe incorporating a cleaning composition comprising a 2-alkyl alkanol and a solvent or a mixture thereof is not disclosed.

US 4,666,621 discloses pre-moistened wipes for cleaning hard surfaces impregnated with a liquid cleaning solution comprising surfactants and up to 40% of a monohydric aliphatic alcohol of 1 to 6 carbon atoms. However, a wet wipe incorporating a cleaning composition comprising a 2-alkyl alkanol and a solvent or a mixture thereof is not disclosed.

Summary of the Invention

The present invention relates to a wet wipe incorporating a cleaning composition comprising a 2-alkyl alkanol and a solvent or a mixture thereof.

In a preferred embodiment according to the present invention said wet wipe is used for wiping various surfaces, preferably hard surfaces.

Detailed Description of the Invention

Wipes

By 'wet wipe' it is meant herein a substrate which incorporates a cleaning composition as described herein. The substrate is provided by a web, typically as a sheet of material cut from the web.

Said web may be made of the sheets of material from which the wipes are produced, preferably cut. The web may be woven or nonwoven, foam, sponge, battings, balls, puffs, films, or tissue paper comprising synthetic and/or man-

made fibres, most preferably the web is nonwoven comprising synthetic and/or man-made fibres.

According to the present invention the sheet may be produced by any method known in the art. For example nonwoven material substrates can be formed by dry forming techniques such as air-laying or wet laying such as on a paper making machine. Other nonwoven manufacturing techniques such as melt blown, spun bonded, needle punched and spun laced methods may also be used. A preferred method is air laying.

While various embodiments of a web to provide a substrate are within the scope of the present invention and are detailed below, in a preferred embodiment the web is air-laid and non-woven comprising man-made fibres.

The term man-made fibre, as used herein, denotes fibres manufactured from cellulose, either derivative or regenerated. They are distinguished from synthetic fibres which are based on synthetic organic polymers. A derivative fibre, as used herein, is one formed when a chemical derivative of a natural polymer, e.g., cellulose, is prepared, dissolved, and extruded as a continuous filament, and the chemical nature of the derivative is retained after the fibre formation process. A regenerated fibre, as used herein, is one formed when a natural polymer, or its chemical derivative, is dissolved and extruded as a continuous filament, and the chemical nature of the natural polymer is either retained or regenerated after the fibre formation process. Typical examples of man made fibres include: regenerated viscose rayon and cellulose acetate. Preferred man-made fibres have a fineness of 0.5 dtex to 3.0 dtex, more preferably of 1.0 dtex to 2.0 dtex, most preferably of 1.6 dtex to 1.8 dtex.

The preferred man made fibre used for the present invention are Lyocell® fibres that are produced by dissolving cellulose fibres in N-methylmorpholine-N-oxide and which are supplied by Tencel Fibres Europe, UK.

Man-made fibres are preferred herein due to their high consumer acceptance and their cheap and typically ecological production. Importantly, man-made fibres and in particular cellulose derived man-made fibres exhibit a high biodegradability, hence are environment friendly after disposal.

According to the present invention the web may comprise man-made fibres at a level of preferably from 5% to 50%, more preferably from 10% to 30%, most preferably from 12% to 25%. Preferably, the web may further comprise a number of different fibre material as hydrophilic fibre material such as viscose, cotton, or flax and a hydrophobic fibre material such as polyethylene tetraphthalate (PET) or polypropylene (PP) in a ratio of 10%-90% hydrophilic and 90%-10% hydrophobic material by weight. A particularly preferred web comprises 70% wood pulp, 12% man-made fibres and 18% latex binder, preferably a butadiene-styrene emulsion.

The web preferably has a weight of at least 20 gm^{-2} and preferably less than 150 gm^{-2}, and most preferably the base weight is in the range of 20 gm^{-2} to 100 gm^{-2}, more preferably from 50 gm^{-2} to 95 gm^{-2}. The web may have any calliper. Typically, when the web is made by an air laying process, the average web calliper is less than 1.0 mm. More preferably the average calliper of the web is from 0.1 mm to 0.9 mm. The web calliper is measured according to standard EDANA nonwoven industry methodology, reference method # 30.4-89.

In addition to the fibres used to make the web, the web can comprise other components or materials added thereto as known in the art, including binders as specified. Furthermore, the web may also comprise agents to improve the optical characteristics of the web such as opacifying agents, for example titanium dioxide.

According to the present invention the web may comprise a non-acrylate binder. The term "binder" as used herein describes any agent employed to interlock fibers. Such agents comprise wet strength resins and dry strength resins. It is often desirable particularly for cellulose based materials to add chemical substances known in the art as wet strength resins. A general dissertation on the types of wet strength resins utilised namely in the paper art can be found in TAPPI monograph series No. 29, Wet Strength in Paper and Paperboard, Technical Association of the Pulp and Paper Industry (New York, 1965). In addition to wet strength additives, it can also be desirable to include certain dry strength and lint control additives known in the art such as starch binders.

Preferred binders used to bond non-wovens are polymeric binders, preferably latex binders, more preferably waterborne latex binders. Suitable binders include butadiene-styrene emulsions, ethylene vinyl acetate emulsions, vinyl acetate, vinyl chloride and combinations thereof. Preferred latex binders are made from styrene, butadiene, acrylonitrile-butadiene emulsions or combination thereof.

The term non-acrylate binder, as used herein, encompasses all latex binders that do not comprise acrylic acid or acrylic acid ester or vinyl acetate monomers. Preferred binders according to the present invention include: Butadiene-styrene emulsions, carboxylated styrene-butadiene emulsion, Acrylonitrile-butadiene emulsions, polyacrylamide resins, Polyamide-epichlorohydrin resin, Acrylonitrile-Butadiene-Styrene emulsion, Styrene Acrylonitrile. The most preferred binder according the present invention is a butadiene-styrene emulsion, which can be commercially obtained from the Ameribol Svnpol Corp. as Rowene™ SB 5550.

The binder can be applied to the web by any method known in the art. Suitable methods include spraying, printing (e.g. flexographic printing), coating (e.g. gravure coating or flood coating), padding, foaming, impregnation, saturation and further extrusion whereby the composition is forced through tubes in contact with the substrate whilst the substrate passes across the tube or combinations of these application techniques. For example spraying the composition on a

rotating surface such as calendar roll that then transfers the composition to the surface of the substrate. The most preferred method for the application of the binder is spraying onto the web. Most preferably the binder is sprayed onto one side of the web in one step of application and onto the other side of the web in a independent step of application.

Typically, the amount of the binder applied to the web, as measured in weight % of the dry weight of the fibres comprised by the web, is from 5% to 30%, more preferably from 10% to 25 %, most preferably from 14% to 22%. Of course the amount of binder to be applied largely depends on the kind of web to be treated.

According to a preferred embodiment of the present invention the wet wipe comprises a substrate which incorporates a cleaning composition as described herein. By "incorporates" it is meant herein that said substrate or wet wipe is coated or impregnated with a liquid cleaning composition as described herein.

In preparing wet wipes according to the present invention, the composition is applied to at least one surface of the substrate material. The composition can be applied at any time during the manufacture of the wet wipe. Preferably the composition can be applied to the substrate after the substrate has been dried. Any variety of application methods that evenly distribute lubricious materials having a molten or liquid consistency can be used. Suitable methods include spraying, printing, (e.g. flexographic printing), coating (e.g. gravure coating or flood coating) extrusion whereby the composition is forced through tubes in contact with the substrate whilst the substrate passes across the tube or combinations of these application techniques. For example spraying the composition on a rotating surface such as calender roll that then transfers the composition to the surface of the substrate. The composition can be applied either to one surface of the substrate or both surfaces, preferably both surfaces. The preferred application method is extrusion coating.

The composition can also be applied uniformly or non uniformly to the surfaces of the substrate. By non uniform it is meant that for example the amount, pattern of distribution of the composition can vary over the surface of the substrate. For example some of the surface of the substrate can have greater or lesser amounts of composition, including portions of the surface that do not have any composition on it. Preferably however the composition is uniformly applied to the surfaces of the wipes. The composition is typically applied in an amount of from about 0.5 g to 10 g per gram of substrate, preferably from 1.0 g to 5 g per gram of substrate, most preferably from 2 g to 4 g per gram of dry substrate.

Preferably, the composition can be applied to the substrate at any point after it has been dried. For example the composition can be applied to the substrate prior to calendering or after calendering and prior to being wound up onto a parent roll. Typically, the application will be carried out on a substrate unwound from a roll having a width equal to a substantial number of wipes it is intended to produce. The substrate with the composition applied thereto is then subsequently perforated utilising standard techniques in order to produce the desired perforation line.

Cleaning composition

The cleaning composition of the present invention is formulated as a liquid composition. A preferred composition herein is an aqueous composition and therefore, preferably comprises water more preferably in an amount of from 60% to 98%, even more preferably of from 80% to 97% and most preferably 85% to 97% by weight of the total composition.

The pH of the liquid composition according to the present invention may typically be from 0 to 14. In a preferred embodiment, the recommended pH range is from 1 to 13, preferably from pH 7 to 12, more preferably from pH 7.0 to 11 and most preferably from pH 8.0 to 10. Indeed, it has been surprisingly found that cleaning performance is further improved at these preferred pH ranges. Accordingly, the

compositions herein may further comprise an acid or base to adjust pH as appropriate.

A suitable acid for use herein is an organic and/or an inorganic acid. A preferred organic acid for use herein has a pka of less than 6. A suitable organic acid is selected from the group consisting of citric acid, lactic acid, glycolic acid, succinic acid, glutaric acid and adipic acid and a mixture thereof. A mixture of said acids may be commercially available from BASF under the trade name Sokalan® DCS. A suitable inorganic acid is selected from the group consisting hydrochloric acid, sulphuric acid, phosphoric acid and a mixture thereof.

A typical level of such an acid, when present, is of from 0.01% to 2.0%, preferably from 0.04% to 1.0% and more preferably from 0.05% to 0.8% by weight of the total composition.

A suitable base to be used herein is an organic and/or inorganic base. Suitable bases for use herein are the caustic alkalis, such as sodium hydroxide, potassium hydroxide and/or lithium hydroxide, and/or the alkali metal oxides such, as sodium and/or potassium oxide or mixtures thereof. A preferred base is a caustic alkali, more preferably sodium hydroxide and/or potassium hydroxide.

Other suitable bases include ammonia, ammonium carbonate, K_2CO_3, Na_2CO_3 and alkanolamines (as e.g. monoethanolamine).

Typical levels of such bases, when present, are of from 0.01% to 2.0%, preferably from 0.05% to 1.0% and more preferably from 0.1% to 0.6% by weight of the total composition.

2-alkyl alkanol

As a first essential ingredient the cleaning composition incorporated onto/into the wet wipes according to the present invention comprises a 2-alkyl alkanol or a mixture thereof.

Particularly suitable to be used in the present invention are the 2-alkyl alkanols having an alkyl chain comprising from 6 to 16, preferably from 7 to 13, more preferably from 8 to 12, most preferably from 8 to 10 carbon atoms and a terminal hydroxy group, said alkyl chain being substituted in the α position (i.e., position number 2) by an alkyl chain comprising from 1 to 10, preferably from 2 to 8 and more preferably 4 to 6 carbon atoms.

Such suitable compounds are commercially available, for instance, as the Isofol ® series such as Isofol® 12 (2-butyl octanol) or Isofol® 16 (2-hexyl decanol) commercially available from Condea.

Preferably said 2-alkyl alkanol is selected from the group consisting of 2-butyl octanol, 2-hexyl decanol, and a mixture thereof. More preferably said 2-alkyl alkanol is 2-butyl octanol.

Typically, the cleaning composition herein may comprise up to 5%, preferably from 0.01% to 1.0%, more preferably from 0.05% to 0.5% and most preferably from 0.1% to 0.2% by weight of the total composition of said 2-alkyl alkanol.

Solvent

As a second essential ingredient the cleaning composition incorporated onto/into the wet wipes according to the present invention comprises a solvent or a mixtures thereof.

Solvents for use herein include all those known to the those skilled in the art of hard-surfaces cleaner compositions.

Suitable solvent is selected from the group consisting of : ethers and diethers having from 4 to 14 carbon atoms, preferably from 6 to 12 carbon atoms, and more preferably from 8 to 10 carbon atoms; glycols or alkoxylated glycols; alkoxylated aromatic alcohols; aromatic alcohols; alkoxylated aliphatic alcohols; aliphatic alcohols; C_8-C_{14} alkyl and cycloalkyl hydrocarbons and halohydrocarbons; C_6-C_{16} glycol ethers; terpenes; and mixtures thereof.

Suitable glycols to be used herein are according to the formula HO-CR_1R_2-OH wherein R_1 and R_2 are independently H or a C_2-C_{10} saturated or unsaturated aliphatic hydrocarbon chain and/or cyclic. Suitable glycols to be used herein are dodecaneglycol and/or propanediol.

Suitable alkoxylated glycols to be used herein are according to the formula R-$(A)_n$-R_1-OH wherein R is H, OH, a linear or branched, saturated or unsaturated alkyl of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 2 to 10, wherein R_1 is H or a linear saturated or unsaturated alkyl of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 2 to 10, and A is an alkoxy group preferably ethoxy, methoxy, and/or propoxy and n is from 1 to 5, preferably 1 to 2. Suitable alkoxylated glycols to be used herein are methoxy octadecanol and/or ethoxyethoxyethanol.

Suitable alkoxylated aromatic alcohols to be used herein are according to the formula R-$(A)_n$-OH wherein R is an alkyl substituted or non-alkyl substituted aryl group of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 2 to 10, wherein A is an alkoxy group preferably butoxy, propoxy and/or ethoxy, and n is an integer of from 1 to 5, preferably 1 to 2. Suitable alkoxylated aromatic alcohols are benzoxyethanol and/or benzoxypropanol.

Suitable aromatic alcohols to be used herein are according to the formula R-OH wherein R is an alkyl substituted or non-alkyl substituted aryl group of from 1 to

20 carbon atoms, preferably from 1 to 15 and more preferably from 1 to 10. For example a suitable aromatic alcohol to be used herein is benzyl alcohol.

Suitable alkoxylated aliphatic alcohols to be used herein are according to the formula $R-(A)_n-OH$ wherein R is a linear or branched, saturated or unsaturated alkyl group of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 3 to 12, wherein A is an alkoxy group preferably butoxy, propoxy and/or ethoxy, and n is an integer of from 1 to 5, preferably 1 to 2. Suitable alkoxylated aliphatic linear or branched alcohols are butoxy propoxy propanol (n-BPP), butoxyethanol, butoxypropanol (n-BP), ethoxyethanol, 1-methylpropoxyethanol, 2-methylbutoxyethanol, or mixtures thereof. Butoxy propoxy propanol is commercially available under the trade name n-BPP® from Dow chemical. Butoxypropanol is commercially available from Dow chemical.

Suitable aliphatic alcohols to be used herein are according to the formula R-OH wherein R is a linear or branched, saturated or unsaturated alkyl group of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 5 to 12. With the proviso that said aliphatic branched alcohols is not a 2-alkyl alkanol as described herein above. Suitable aliphatic alcohols are methanol, ethanol, propanol, isopropanol or mixtures thereof.

Suitable terpenes to be used herein monocyclic terpenes, dicyclic terpenes and/or acyclic terpenes. Suitable terpenes are : D-limonene; pinene; pine oil; terpinene; terpene derivatives as menthol, terpineol, geraniol, thymol; and the citronella or citronellol types of ingredients.

Other suitable solvents include butyl diglycol ether (BDGE), hexandiols, butyltriglycol ether, ter amilic alcohol and the like. BDGE is commercially available from Union Carbide or from BASF under the trade name Butyl CARBITOL®.

Preferably said solvent is selected from the group consisting of butoxy propoxy propanol, butyl diglycol ether, benzyl alcohol, butoxypropanol, ethanol, methanol, isopropanol, hexandiols and mixtures thereof. More preferably said solvent is selected from the group consisting of butoxy propoxy propanol, butyl diglycol ether, benzyl alcohol, butoxypropanol, ethanol, methanol, isopropanol and mixtures thereof. Even more preferably said solvent is selected from the group consisting of butyl diglycol ether, butoxypropanol, ethanol and mixtures thereof.

Typically, the cleaning composition herein may comprise up to 30%, preferably from 5% to 25%, more preferably from 5% to 20% and most preferably from 10% to 15% by weight of the total composition of said solvent.

In a preferred embodiment the solvent comprised in cleaning composition according to the present invention is a volatile solvent or a mixture thereof, preferably a volatile solvent or a mixture thereof in combination with another solvent or a mixture thereof.

The Applicant has found that the combination of a 2-alkyl alkanol and a solvent as described herein in a cleaning compositions incorporated onto or into a wet wipe provides acceptable wetting capabilities and thus provides a streak-fee cleaning benefit and/or a cleaning performance benefit on a wide range of stains and surfaces whilst showing an evaporation benefit.

By "wetting" it is meant herein that the composition forms a film, instead of single droplets, when applied onto a surface, particularly a hydrophobic surface, and/or does not form droplets on said surface when drying.

Indeed, the wetting capabilities as described herein allow the composition to evenly spread out as a film. The formation of a film of said cleaning composition results in a even distribution of said composition over the surface and thus increases the overall cleaning performance of said cleaning composition (cleaning performance benefit).

Furthermore, the wetting capabilities as described herein allow the composition to remain on said surface as a film during drying. The formation of droplets during drying can result in visible residues ("streaks") on said surface. By contrast, the drying as a film results in the reduction or even the prevention of visible residues after drying (streak-free cleaning benefit).

Solvents as discussed herein provide a cleaning performance benefit especially on greasy soils. Moreover, solvents, preferably volatile solvents, as for example ethanol, more preferably volatile solvents in combination with another solvent or a mixture thereof, allow to formulate cleaning compositions showing a fast evaporation profile due to their high volatility (evaporation benefit) resulting in a fast drying of the cleaning composition once it is applied onto a surface.

Furthermore, the wetting capabilities as described herein resulting in the formation of an even film of cleaning composition on the surface, to which said composition has been applied to, resulting in an improved evaporation benefit.

Optional ingredients

Surfactants

The cleaning compositions of the present invention comprise a surfactant, or mixtures thereof as a highly preferred optional ingredient.

Said surfactant may be present in the compositions according to the present invention in amounts of from 0.01% to 50%, preferably of from 0.1% to 20%, and more preferably of from 0.5% to 1% by weight of the total composition.

Surfactants are desired herein as they further contribute to the cleaning performance benefit of the cleaning compositions of the present invention and/or provide a gloss benefit to the cleaning composition of the present invention.

Furthermore, the combination of the 2-alkyl alkanol with a surfactant when present results in an improved wetting, providing a further improved streak-free cleaning and/or cleaning performance benefit.

Surfactants for use herein include nonionic surfactants, anionic surfactants, cationic surfactants, amphoteric surfactants, zwitterionic surfactants, and mixtures thereof.

Particularly preferred surfactants are the nonionic surfactants. Suitable nonionic surfactants for use herein include a class of compounds which may be broadly defined as compounds produced by the condensation of alkylene oxide groups (hydrophilic in nature) with an organic hydrophobic compound, which may be branched or linear aliphatic (e.g. Guerbet or secondary alcohols) or alkyl aromatic in nature. The length of the hydrophilic or polyoxyalkylene radical which is condensed with any particular hydrophobic group can be readily adjusted to yield a water-soluble compound having the desired degree of balance between hydrophilic and hydrophobic elements. For example, a well-known class of nonionic synthetic detergents is made available on the market under the trade names "Pluronic", "Neodol" and "Empilan". These compounds are formed by condensing ethylene oxide with an hydrophobic base formed by the condensation of propylene oxide with propylene glycol. The hydrophobic portion of the molecule which, of course, exhibits water-insolubility has a molecular weight of from about 1500 to 1800. The addition of polyoxyethylene radicals to this hydrophobic portion tends to increase the water-solubility of the molecule as a whole and the liquid character of the products is retained up to the point where polyoxyethylene content is about 50% of the total weight of the condensation product.

Other suitable nonionic synthetic detergents include :

(i) The polyethylene oxide condensates of alkyl phenols, e.g., the condensation products of alkyl phenols having an alkyl group containing

from about 6 to 12 carbon atoms in either a straight chain or branched chain configuration, with ethylene oxide, the said ethylene oxide being present in amounts equal to 10 to 25 moles of ethylene oxide per mole of alkyl phenol. The alkyl substituent in such compounds may be derived from polymerised propylene, diisobutylene, octane, and nonane;

(ii) Those derived from the condensation of ethylene oxide with the product resulting from the reaction of propylene oxide and ethylene diamine products which may be varied in composition depending upon the balance between the hydrophobic and hydrophilic elements which is desired. Examples are compounds containing from about 40% to about 80% polyoxyethylene by weight and having a molecular weight of from about 5000 to about 11000 resulting from the reaction of ethylene oxide groups with a hydrophobic base constituted of the reaction product of ethylene diamine and excess propylene oxide, said base having a molecular weight of the order of 2500 to 3000;

(iii) The condensation product of aliphatic alcohols having from 8 to 18 carbon atoms, in either straight chain or branched chain configuration, with ethylene oxide, e.g., a coconut alcohol ethylene oxide condensate having from 10 to 30 moles of ethylene oxide per mole of coconut alcohol, the coconut alcohol fraction having from 10 to 14 carbon atoms;

(iv) Trialkyl amine oxides and trialkyl phosphine oxides wherein one alkyl group ranges from 10 to 18 carbon atoms and two alkyl groups range from 1 to 3 carbon atoms; the alkyl groups can contain hydroxy substituents; specific examples are dodecyl di(2-hydroxyethyl)amine oxide and tetradecyl dimethyl phosphine oxide.

Also useful as a nonionic surfactant are the alkylpolysaccharides disclosed in U.S. Patent 4,565,647, Llenado, issued January 21, 1986, having a hydrophobic group containing from about 6 to about 30 carbon atoms, preferably from about

10 to about 16 carbon atoms and polysaccharide, e.g., a polyglycoside, hydrophilic group containing from about 1.3 to about 10, preferably from about 1.3 to about 3, most preferably from about 1.3 to about 2.7 saccharide units. Any reducing saccharide containing 5 or 6 carbon atoms can be used, e.g., glucose, galactose, and galactosyl moieties can be substituted for the glucosyl moieties. (Optionally the hydrophobic group is attached at the 2-, 3-, 4-, etc. positions thus giving a glucose or galactose as opposed to a glucoside or galactoside.) The intersaccharide bonds can be, e.g., between the one position of the additional saccharide units and the 2-, 3-, 4-, and/or 6- positions of the preceding saccharide units.

Optionally, and less desirably, there can be a polyalkyleneoxide chain joining the hydrophobic moiety and the polysaccharide moiety. The preferred alkyleneoxide is ethylene oxide. Typical hydrophobic groups include alkyl groups, either saturated or unsaturated, branched or unbranched containing from about 8 to about 18, preferably from about 10 to about 16, carbon atoms. Preferably, the alkyl group can contain up to about 3 hydroxy groups and/or the polyalkyleneoxide chain can contain up to about 10, preferably less than 5, alkyleneoxide moieties. Suitable alkyl polysaccharides are octyl, nonyldecyl, undecyldodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, and octadecyl, di-, tri-, tetra-, penta-, and hexaglucosides, galactosides, lactosides, glucoses, fructosides, fructoses and/or galactoses. Suitable mixtures include coconut alkyl, di-, tri-, tetra-, and pentaglucosides and tallow alkyl tetra-, penta-, and hexaglucosides.

The preferred alkylpolyglycosides have the formula:

$$R^2O(C_nH_{2n}O)_t(\text{glucosyl})_x$$

wherein R^2 is selected from the group consisting of alkyl, alkylphenyl, hydroxyalkyl, hydroxyalkylphenyl, and mixtures thereof in which the alkyl groups

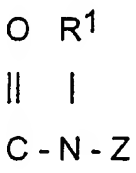
contain from about 10 to about 18, preferably from about 12 to about 14, carbon atoms; n is 2 or 3, preferably 2; t is from 0 to about 10, preferably 0; and x is from about 1.3 to about 10, preferably from about 1.3 to about 3, most preferably from about 1.3 to about 2.7. The glycosyl is preferably derived from glucose. To prepare these compounds, the alcohol or alkylpolyethoxy alcohol is formed first and then reacted with glucose, or a source of glucose, to form the glucoside (attachment at the 1-position). The additional glycosyl units can then be attached between their 1-position and the preceding glycosyl units 2-, 3-, 4- and/or 6-position, preferably predominantely the 2- position.

Although not preferred, the condensation products of ethylene oxide with a hydrophobic base formed by the condensation of propylene oxide with propylene glycol are also suitable for use herein. The hydrophobic portion of these compounds will preferably have a molecular weight of from about 1500 to about 1800 and will exhibit water insolubility. The addition of polyoxyethylene moieties to this hydrophobic portion tends to increase the water solubility of the molecule as a whole, and the liquid character of the product is retained up to the point where the polyoxyethylene content is about 50% of the total weight of the condensation product, which corresponds to condensation with up to about 40 moles of ethylene oxide. Examples of compounds of this type include certain of the commercially available Pluronic™ surfactants, marketed by BASF.

Also not preferred, although suitable for use as nonionic surfactants herein are the condensation products of ethylene oxide with the product resulting from the reaction of propylene oxide and ethylenediamine. The hydrophobic moiety of these products consists of the reaction product of ethylenediamine and excess propylene oxide, and generally has a molecular weight of from about 2,500 to about 3,000. This hydrophobic moiety is condensed with ethylene oxide to the extent that the condensation product contains from about 40% to about 80% by weight of polyoxyethylene and has a molecular weight of from about 5,000 to

about 11,000. Examples of this type of nonionic surfactant include certain of the commercially available Tetronic^{TM} compounds, marketed by BASF.

Other suitable nonionic surfactants for use herein include polyhydroxy fatty acid amides of the structural formula :



(I)

wherein : R^1 is H, C_1-C_4 hydrocarbyl, 2-hydroxy ethyl, 2-hydroxypropyl, or a mixture thereof, preferably C_1-C_4 alkyl, more preferably C_1 or C_2 alkyl, most preferably C_1 alkyl (i.e., methyl); and R^2 is a C_5-C_{31} hydrocarbyl, preferably straight chain C_7-C_{19} alkyl or alkenyl, more preferably straight chain C_9-C_{17} alkyl or alkenyl, most preferably straight chain C_{11}-C_{17} alkyl or alkenyl, or mixtures thereof; and Z is a polyhydroxyhydrocarbyl having a linear hydrocarbyl chain with at least 3 hydroxyls directly connected to the chain, or an alkoxylated derivative (preferably ethoxylated or propoxylated) thereof. Z preferably will be derived from a reducing sugar in a reductive amination reaction; more preferably Z is a glycityl. Suitable reducing sugars include glucose, fructose, maltose, lactose, galactose, mannose, and xylose. As raw materials, high dextrose corn syrup can be utilised as well as the individual sugars listed above. These corn syrups may yield a mix of sugar components for Z. It should be understood that it is by no means intended to exclude other suitable raw materials. Z preferably will be selected from the group consisting of $-CH_2-(CHOH)_n-CH_2OH$, $-CH(CH_2OH)-(CHOH)_{n-1}-CH_2OH$, $-CH_2-(CHOH)_2(CHOR')(CHOH)-CH_2OH$, where n is an integer from 3 to 5, inclusive, and R' is H or a cyclic or aliphatic monosaccharide, and alkoxylated derivatives thereof. Most preferred are glycityls wherein n is 4, particularly $-CH_2-(CHOH)_4-CH_2OH$.

In Formula (I), R^1 can be, for example, N-methyl, N-ethyl, N-propyl, N-isopropyl, N-butyl, N-2-hydroxy ethyl, or N-2-hydroxy propyl.

R^2-CO-N< can be, for example, cocamide, stearamide, oleamide, lauramide, myristamide, capricamide, palmitamide, tallowamide, etc.

Z can be 1-deoxyglucityl, 2-deoxyfructityl, 1-deoxymaltityl, 1-deoxylactityl, 1-deoxygalactityl, 1-deoxymannityl, 1-deoxymaltotriotityl, etc.

In one embodiment herein suitable nonionic surfactants for use herein are polyethylene oxide condensates of alkyl phenols, condensation products of primary and secondary aliphatic alcohols with from about 1 to about 25 moles of ethylene oxide, alkylpolysaccharides, and mixtures thereof. Most preferred are C_8-C_{14} alkyl phenol ethoxylates having from 3 to 15 ethoxy groups and C_8-C_{18} alcohol ethoxylates (preferably C_{10} avg.) having from 2 to 10 ethoxy groups, and mixtures thereof.

Particularly preferred surfactants include also the anionic surfactants. Suitable anionic surfactants for use herein include alkali metal (e.g., sodium or potassium) fatty acids, or soaps thereof, containing from about 8 to about 24, preferably from about 10 to about 20 carbon atoms.

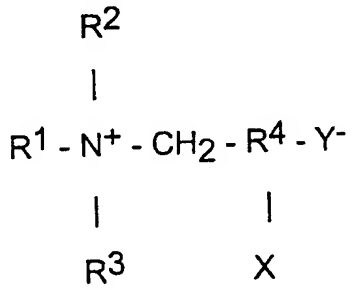
The fatty acids including those used in making the soaps can be obtained from natural sources such as, for instance, plant or animal-derived glycerides (e.g., palm oil, coconut oil, babassu oil, soybean oil, castor oil, tallow, whale oil, fish oil, tallow, grease, lard and mixtures thereof). The fatty acids can also be synthetically prepared (e.g., by oxidation of petroleum stocks or by the Fischer-Tropsch process). Alkali metal soaps can be made by direct soapification of fats and oils or by the neutralisation of the free fatty acids which are prepared in a separate manufacturing process. Particularly useful are the sodium and potassium salts of the mixtures of fatty acids derived from coconut oil and tallow, i.e., sodium and potassium tallow and coconut soaps.

The term "tallow" is used herein in connection with fatty acid mixtures which typically have an approximate carbon chain length distribution of 2.5% C_{14}, 29% C_{16}, 23% C_{18}, 2% palmitoleic, 41.5% oleic and 3% linoleic (the first three fatty acids listed are saturated). Other mixtures with similar distribution, such as the fatty acids derived from various animal tallows and lard, are also included within the term tallow. The tallow can also be hardened (i.e., hydrogenated) to convert part or all of the unsaturated fatty acid moieties to saturated fatty acid moieties. When the term "coconut" is used herein it refers to fatty acid mixtures which typically have an approximate carbon chain length distribution of about 8% C_8, 7% C_{10}, 48% C_{12}, 17% C_{14}, 9% C_{16}, 2% C_{18}, 7% oleic, and 2% linoleic (the first six fatty acids listed being saturated). Other sources having similar carbon chain length distribution such as palm kernel oil and babassu oil are included with the term coconut oil.

Other suitable anionic surfactants for use herein include water-soluble salts, particularly the alkali metal salts, of organic sulphuric reaction products having in the molecular structure an alkyl radical containing from about 8 to about 22 carbon atoms and a radical selected from the group consisting of sulfonic acid and sulphuric acid ester radicals. Important examples of these synthetic detergents are the sodium, ammonium or potassium alkyl sulfates, especially those obtained by sulphating the higher alcohols produced by reducing the glycerides of tallow or coconut oil; sodium or potassium alkyl benzene sulfonates, in which the alkyl group contains from about 9 to about 15 carbon atoms, especially those of the types described in U.S. Pat. Nos. 2,220,099 and 2,477,383, incorporated herein by reference; sodium alkyl glyceryl ether sulfonates, especially those ethers of the higher alcohols derived from tallow and coconut oil; sodium coconut oil fatty acid monoglyceride sulfates and sulfonates; sodium or potassium salts of sulphuric acid esters of the reaction product of one mole of a higher fatty alcohol (e.g., tallow or coconut oil alcohols) and about three moles of ethylene oxide; sodium or potassium salts of alkyl phenol ethylene

oxide ether sulfates with about four units of ethylene oxide per molecule and in which the alkyl radicals contain about 9 carbon atoms; the reaction product of fatty acids esterified with isothionic acid and neutralised with sodium hydroxide where, for example, the fatty acids are derived from coconut oil; sodium or potassium salts of fatty acid amide of a methyl taurine in which the fatty acids, for example, are derived from coconut oil; and others known in the art, a number being specifically set forth in U.S. Pat. Nos. 2,486,921, 2,486,922 and 2,396,278, incorporated herein by reference.

Suitable zwitterionic detergents for use herein comprise the betaine and betaine-like detergents wherein the molecule contains both basic and acidic groups which form an inner salt giving the molecule both cationic and anionic hydrophilic groups over a broad range of pH values. Some common examples of these detergents are described in U.S. Pat. Nos. 2,082,275, 2,702,279 and 2,255,082, incorporated herein by reference. Preferred zwitterionic detergent compounds have the formula:



wherein R1 is an alkyl radical containing from 8 to 22 carbon atoms, R2 and R3 contain from 1 to 3 carbon atoms, R4 is an alkylene chain containing from 1 to 3 carbon atoms, X is selected from the group consisting of hydrogen and a hydroxyl radical, Y is selected from the group consisting of carboxyl and sulfonyl radicals and wherein the sum of R1, R2 and R3 radicals is from 14 to 24 carbon atoms.

Amphoteric and ampholytic detergents which can be either cationic or anionic depending upon the pH of the system are represented by detergents such as

dodecylbeta-alanine, N-alkyltaurines such as the one prepared by reacting dodecylamine with sodium isethionate according to the teaching of U.S. Pat. No. 2,658,072, N-higher alkylaspartic acids such as those produced according to the teaching of U.S. Pat. No. 2,438,091, and the products sold under the trade name "Miranol", and described in U.S. Pat. No. 2,528,378, said patents being incorporated herein by reference. Additional synthetic detergents and listings of their commercial sources can be found in McCutcheon's Detergents and Emulsifiers, North American Ed. 1980, incorporated herein by reference.

Suitable amphoteric surfactants include the amine oxides corresponding to the formula:

R R' R" N→O

wherein R is a primary alkyl group containing 6-24 carbons, preferably 10-18 carbons, and wherein R' and R" are, each, independently, an alkyl group containing 1 to 6 carbon atoms. The arrow in the formula is a conventional representation of a semi-polar bond. The preferred amine oxides are those in which the primary alkyl group has a straight chain in at least most of the molecules, generally at least 70%, preferably at least 90% of the molecules, and the amine oxides which are especially preferred are those in which R contains 10-18 carbons and R' and R" are both methyl. Exemplary of the preferred amine oxides are the N-hexyldimethylamine oxide, N-octyldimethylamine oxide, N-decyldimethylamine oxide, N-dodecyl dimethylamine oxide, N-tetradecyldimethylamine oxide, N-hexadecyl dimethylamine oxide, N-octadecyldimethylamine oxide, N-eicosyldimethylamine oxide, N-docosyldimethylamine oxide, N-tetracosyl dimethylamine oxide, the corresponding amine oxides in which one or both of the methyl groups are replaced with ethyl or 2-hydroxyethyl groups and mixtures thereof. A most preferred amine oxide for use herein is N-decyldimethylamine oxide.

Other suitable amphoteric surfactants for the purpose of the invention are the phosphine or sulfoxide surfactants of formula:

R R' R" A→O

wherein A is phosphorus or sulphur atom, R is a primary alkyl group containing 6-24 carbons, preferably 10-18 carbons, and wherein R' and R" are, each, independently selected from methyl, ethyl and 2-hydroxyethyl. The arrow in the formula is a conventional representation of a semi-polar bond.

Cationic surfactants suitable for use in compositions of the present invention are those having a long-chain hydrocarbyl group. Examples of such cationic surfactants include the ammonium surfactants such as alkyldimethylammonium halogenides, and those surfactants having the formula:

$$[R^2(OR^3)_y][R^4(OR^3)_y]_2R^5N^+X^-$$

wherein R^2 is an alkyl or alkyl benzyl group having from 8 to 18 carbon atoms in the alkyl chain, each R^3 is selected from the group consisting of $-CH_2CH_2-$, $-CH_2CH(CH_3)-$, $-CH_2CH(CH_2OH)-$, $-CH_2CH_2CH_2-$, and mixtures thereof; each R^4 is selected from the group consisting of C_1-C_4 alkyl, C_1-C_4 hydroxyalkyl, benzyl ring structures formed by joining the two R^4 groups, $-CH_2CHOH-CHOHCOR^6CHOHCH_2OH$ wherein R^6 is any hexose or hexose polymer having a molecular weight less than about 1000, and hydrogen when y is not 0; R^5 is the same as R^4 or is an alkyl chain wherein the total number of carbon atoms of R^2 plus R^5 is not more than about 18; each y is from 0 to about 10 and the sum of the y values is from 0 to about 15; and X is any compatible anion.

Other cationic surfactants useful herein are also described in U.S. Patent 4,228,044, Cambre, issued October 14, 1980, incorporated herein by reference.

In a preferred embodiment, said surfactant is selected from the group consisting of nonionic surfactants, anionic surfactants and mixtures thereof. Preferably, said surfactant is selected from the group consisting of : polyethylene oxide condensates of alkyl phenols; condensation products of primary and secondary aliphatic alcohols with from about 1 to about 25 moles of ethylene oxide; alkylpolysaccharides; alkyl sulfates; alkyl benzene sulphonates; and mixtures thereof. More preferably, said surfactant is selected from the group consisting of : condensation products of primary and secondary aliphatic alcohols with from about 1 to about 25 moles of ethylene oxide; alkyl benzene sulphonates; and mixtures thereof

Perfumes

The cleaning compositions of the present invention comprise a perfume or a mixture thereof as a highly preferred optional ingredient.

Suitable perfumes for use herein include materials which provide an olfactory aesthetic benefit and/or cover any "chemical" odour that the product may have.

The main function of a small fraction of the highly volatile, low boiling (having low boiling points), perfume components in these perfumes is to improve the fragrance odour of the product itself, rather than impacting on the subsequent odour of the surface being cleaned. However, some of the less volatile, high boiling perfume ingredients provide a fresh and clean impression to the surfaces, and it is desirable that these ingredients be deposited and present on the dry surface. Perfume ingredients can be readily solubilized in the compositions, for instance by the nonionic detergent surfactants, when present. The perfume ingredients and compositions suitable to be used herein are the conventional ones known in the art. Selection of any perfume component, or amount of perfume, is based solely on aesthetic considerations.

Furthermore, the combination of the 2-alkyl alkanol with a perfume when present results in an improved wetting providing a further improved streak-free cleaning and/or cleaning performance benefit. In addition, the high volatility of certain perfumes, when present, further improves the evaporation profile of a cleaning composition according to the present invention and thereby provides an improved evaporation benefit resulting in an even faster drying.

Suitable perfume compounds and compositions can be found in the art including U.S. Pat. Nos. : 4,145,184, Brain and Cummins, issued March 20, 1979; 4,209,417, Whyte, issued June 24, 1980; 4,515,705, Moeddel, issued May 7, 1985; and 4,152,272, Young, issued May 1, 1979, all of said patents being incorporated herein by reference. In general, the degree of substantivity of a perfume is roughly proportional to the percentages of substantive perfume material used. Relatively substantive perfumes contain at least about 1%, preferably, at least about 10%, substantive perfume materials.Substantive perfume materials are those odorous compounds that deposit on surfaces via the cleaning process and are detectable by people with normal olfactory acuity. Such materials typically have vapour pressures lower than that of the average perfume material. Also, they typically have molecular weights of about 200 and above, and are detectable at levels below those of the average perfume material.Perfume ingredients useful herein, along with their odour character, and their physical and chemical properties, such as boiling point and molecular weight, are given in "Perfume and Flavor Chemicals (Aroma Chemicals)," Steffen Arctander, published by the author, 1969, incorporated herein by reference.

Examples of the highly volatile, low boiling, perfume ingredients are : anethole, benzaldehyde, benzyl acetate, benzyl alcohol, benzyl formate, iso-bornyl acetate, camphene, ciscitral (neral), citronellal, citronellol, citronellyl acetate, para-cymene, decanal, dihydrolinalool, dihydromyrcenol, dimethyl phenyl carbinol, eucaliptol, geranial, geraniol, geranyl acetate, geranyl nitrile, cis-3-hexenyl acetate, hydroxycitronellal, d-limonene, linalool, linalool oxide, linalyl acetate, linalyl propionate, methyl anthranilate, alpha-methyl ionone, methyl nonyl

acetaldehyde, methyl phenyl carbinyl acetate, laevo-menthyl acetate, menthone, iso-menthone, mycrene, myrcenyl acetate, myrcenol, nerol, neryl acetate, nonyl acetate, phenyl ethyl alcohol, alpha-pinene, beta-pinene, gamma-terpinene, alpha-terpineol, beta-terpineol, terpinyl acetate, and vertenex (para-tertiary-butyl cyclohexyl acetate). Some natural oils also contain large percentages of highly volatile perfume ingredients. For example, lavandin contains as major components : linalool; linalyl acetate; geraniol; and citronellol. Lemon oil and orange terpenes both contain about 95% of d-limonene.

Examples of moderately volatile perfume ingredients are : amyl cinnamic aldehyde, iso-amyl salicylate, beta-caryophyllene, cedrene, cinnamic alcohol, coumarin, dimethyl benzyl carbinyl acetate, ethyl vanillin, eugenol, iso-eugenol, flor acetate, heliotropine, 3-cis-hexenyl salicylate, hexyl salicylate, lilial (para-tertiarybutyl-alpha-methyl hydrocinnamic aldehyde), gamma-methyl ionone, nerolidol, patchouli alcohol, phenyl hexanol, beta-selinene, trichloromethyl phenyl carbinyl acetate, triethyl citrate, vanillin, and veratraldehyde. Cedarwood terpenes are composed mainly of alpha-cedrene, beta-cedrene, and other C15H24 sesquiterpenes.

Examples of the less volatile, high boiling, perfume ingredients are : benzophenone, benzyl salicylate, ethylene brassylate, galaxolide (1,3,4,6,7,8-hexahydro-4,6,6,7,8,8-hexamethyl-cyclopenta-gama-2-benzopyran), hexyl cinnamic aldehyde, lyral (4-(4-hydroxy-4-methyl pentyl)-3-cyclohexene-10-carboxaldehyde), methyl cedrylone, methyl dihydro jasmonate, methyl-beta-naphthyl ketone, musk indanone, musk ketone, musk tibetene, and phenylethyl phenyl acetate.

Selection of any particular perfume ingredient is primarily dictated by aesthetic considerations.

The compositions herein may comprise a perfume or a mixture thereof, in amounts up to 5.0%, preferably in amounts of 0.01% to 1.5%, more preferably in

amounts of 0.05% to 1.0%, even more preferably in amounts of 0.1% to 0.5%, by weight of the total composition.

Antifoaming agent

The wet wipes preferably also comprise an antifoaming agent, preferably in the liquid composition. Any antifoaming agent known in the art is suitable for the present invention. Highly preferred antifoaming agents are those comprising silicone. Preferred antifoaming agents may further comprise a fatty acid and/or a capped alkoxylated nonionic surfactant as defined herein after.

Preferably the amount of antifoaming agent used expressed in weight percent is from 0.01% to 5%, more preferably from 0.1% to 1%, most preferably from 0.1% to 0.6 % of the weight of the dry substrate material.

Typically, the compositions herein comprise from $1 \cdot 10^{-4}$ % to 10%, preferably from $1 \cdot 10^{-3}$ % to 5% and more preferably from $1 \cdot 10^{-2}$ % to 5% by weight of the total composition of a fatty acid or a mixture thereof.

Typically, the compositions herein comprise from $1 \cdot 10^{-3}$ % to 20%, preferably from $1 \cdot 10^{-2}$ % to 10% and more preferably from $5 \cdot 10^{-2}$ % to 5% by weight of the total composition of a capped alkoxylated nonionic surfactant as defined herein or a mixture thereof.

Typically, the compositions herein comprise from $1 \cdot 10^{-5}$ % to 5%, preferably from $1 \cdot 10^{-5}$ % to 1% and more preferably from $1 \cdot 10^{-4}$ % to 0.5% by weight of the total composition of a silicone or a mixture thereof.

In a preferred embodiment of the present invention, the antifoaming agent comprises a silicone and a fatty acid. To get optimum defoaming properties to the compositions of the present invention and are typically present at a weight

ratio of fatty acid : silicone of 1 : $1 \cdot 10^{-5}$ to 10 :1 and preferably from 1 :$1 \cdot 10^{-4}$ to 1 : 1.

In another preferred embodiment of the present invention, the three foam reducing agents described herein are used together. To get optimum defoaming properties to the compositions of the present invention and are typically present at a weight ratio of fatty acid : capped nonionic surfactant: silicone of $1:1 \cdot 10^{3}:1 \cdot 10^{-5}$ to 10:1:1 and preferably from 1: $1 \cdot 10^{2}:1 \cdot 10^{-4}$ to 1:1:1.

Suitable fatty acids for use herein are the alkali salts of a C_8-C_{24} fatty acid. Preferred fatty acids for use herein contain from 8 to 22 carbon atoms, preferably from 8 to 20 and more preferably from 8 to 18. Suitable fatty acids may be selected from caprylic acid, capric acid, lauric acid, myristic acid, palmitic acid, stearic acid and mixtures of fatty acids suitably hardened, derived from natural sources such as plant or animal esters (e.g., palm oil, coconut oil, soybean oil, castor oil, tallow, ground oil, whale and fish oils and/or babassu oil.

Suitable capped alkoxylated nonionic surfactants for use herein are according to the formula:

$$R_1(O\text{-}CH_2\text{-}CH_2)_n\text{-}(OR_2)_m\text{-}O\text{-}R_3$$

wherein R_1 is a C_8-C_{24} linear or branched alkyl or alkenyl group, aryl group, alkaryl group, preferably R_1 is a C_8-C_{18} alkyl or alkenyl group, more preferably a C_{10}-C_{15} alkyl or alkenyl group, even more preferably a C_{10}-C_{15} alkyl group; wherein R_2 is a C_1-C_{10} linear or branched alkyl group, preferably a C_2-C_{10} linear or branched alkyl group, preferably a C_3 group; wherein R_3 is a C_1-C_{10} alkyl or alkenyl group, preferably a C_1-C_5 alkyl group, more preferably methyl;and wherein n and m are integers independently ranging in the range of from 1 to 20, preferably from 1 to 10, more preferably from 1 to 5; or mixtures thereof.

Suitable silicones for use herein include any silicone and silica-silicone mixtures. Silicones can be generally represented by alkylated polysiloxane materials while silica is normally used in finely divided forms exemplified by silica aerogels and xerogels and hydrophobic silicas of various types. These materials can be incorporated as particulates in which the silicone is advantageously releasably incorporated in a water-soluble or water-dispersible, substantially non-surface-active detergent impermeable carrier. Alternatively, the silicone can be dissolved or dispersed in a liquid carrier and applied by spraying on to one or more of the other components.

One preferred antifoaming agent in accordance with the present invention is available from Wacker as Wacker silicone antifoaming emulsion SE 2®.

Other optional ingredients:

The liquid compositions according to the present invention may comprise a variety of other optional ingredients depending on the technical benefit aimed for and the surface treated.

Suitable optional ingredients for use herein include builders, chelants, polymers, buffers, bactericides, hydrotropes, colorants, stabilisers, radical scavengers, bleaches, bleach activators, enzymes, soil suspenders, dye transfer agents, brighteners, anti dusting agents, dispersants, dye transfer inhibitors, pigments and/or dyes.

Chelating agents

Another class of optional compounds for use herein include chelating agents or mixtures thereof. Chelating agents can be incorporated in the compositions herein in amounts ranging from 0.0% to 10.0% by weight of the total composition, preferably 0.1% to 5.0%.

Suitable phosphonate chelating agents for use herein may include alkali metal ethane 1-hydroxy diphosphonates (HEDP), alkylene poly (alkylene phosphonate), as well as amino phosphonate compounds, including amino aminotri(methylene phosphonic acid) (ATMP), nitrilo trimethylene phosphonates (NTP), ethylene diamine tetra methylene phosphonates, and diethylene triamine penta methylene phosphonates (DTPMP). The phosphonate compounds may be present either in their acid form or as salts of different cations on some or all of their acid functionalities. Preferred phosphonate chelating agents to be used herein are diethylene triamine penta methylene phosphonate (DTPMP) and ethane 1-hydroxy diphosphonate (HEDP). Such phosphonate chelating agents are commercially available from Monsanto under the trade name DEQUEST®.

Polyfunctionally-substituted aromatic chelating agents may also be useful in the compositions herein. See U.S: patent 3,812,044, issued May 21, 1974, to Connor et al. Preferred compounds of this type in acid form are dihydroxydisulfobenzenes such as 1,2-dihydroxy -3,5-disulfobenzene.

A preferred biodegradable chelating agent for use herein is ethylene diamine N,N'- disuccinic acid, or alkali metal, or alkaline earth, ammonium or substitutes ammonium salts thereof or mixtures thereof. Ethylenediamine N,N'- disuccinic acids, especially the (S,S) isomer have been extensively described in US patent 4, 704, 233, November 3, 1987, to Hartman and Perkins. Ethylenediamine N,N'-disuccinic acids is, for instance, commercially available under the tradename ssEDDS® from Palmer Research Laboratories.

Suitable amino carboxylates for use herein include ethylene diamine tetra acetates, diethylene triamine pentaacetates, diethylene triamine pentaacetate (DTPA),N- hydroxyethylethylenediamine triacetates, nitrilotri-acetates, ethylenediamine tetrapropionates, triethylenetetraaminehexa-acetates, ethanol-diglycines, propylene diamine tetracetic acid (PDTA) and methyl glycine di-acetic

acid (MGDA), both in their acid form, or in their alkali metal, ammonium, and substituted ammonium salt forms. Particularly suitable amino carboxylates to be used herein are diethylene triamine penta acetic acid, propylene diamine tetracetic acid (PDTA) which is, for instance, commercially available from BASF under the trade name Trilon FS® and methyl glycine di-acetic acid (MGDA).

Further carboxylate chelating agents for use herein include salicylic acid, aspartic acid, glutamic acid, glycine, malonic acid or mixtures thereof.

Builders:

The liquid compositions of the present invention may also comprises a builder or a mixture thereof, as an optional ingredient. Suitable builders for use herein include polycarboxylates and polyphosphates, and salts thereof. Typically, the compositions of the present invention comprise up to 20.0 % by weight of the total composition of a builder or mixtures thereof, preferably from 0.1% to 10.0% , and more preferably from 0.5% to 5.0%.

Suitable and preferred polycarboxylates for use herein are organic polycarboxylates where the highest LogKa, measured at 25°C/0.1M ionic strength is between 3 and 8, wherein the sum of the LogKCa + LogKMg, measured at 25°C/0.1M ionic strength is higher than 4, and wherein LogKCa = LogKMg $\pm$ 2 units, measured at 25°C/0.1M ionic strength.

Such suitable and preferred polycarboxylates include citrate and complexes of the formula:

CH(A)(COOX)-CH(COOX)-O-CH(COOX)-CH(COOX)(B)

wherein A is H or OH; B is H or -O-CH(COOX)-CH_2(COOX); and X is H or a salt-forming cation. For example, if in the above general formula A and B are both H,

then the compound is oxydisuccinic acid and its water-soluble salts. If A is OH and B is H, then the compound is tartrate monosuccinic acid (TMS) and its water-soluble salts. If A is H and B is -O-CH(COOX)-CH_2(COOX), then the compound is tartrate disuccinic acid (TDS) and its water-soluble salts. Mixtures of these builders are especially preferred for use herein. Particularly TMS to TDS, these builders are disclosed in U.S. Patent 4,663,071, issued to Bush et al., on May 5, 1987.

Still other ether polycarboxylates suitable for use herein include copolymers of maleic anhydride with ethylene or vinyl methyl ether, 1, 3, 5-trihydroxy benzene-2, 4, 6-trisulfonic acid.

Other useful polycarboxylate builders include the ether hydroxypolycarboxylates represented by the structure :

H0-[C(R)(COOM)-C(R)(COOM)-O]$_n$-H

wherein M is hydrogen or a cation wherein the resultant salt is water-soluble, preferably an alkali metal, ammonium or substituted ammonium cation, n is from about 2 to about 15 (preferably n is from about 2 to about 10, more preferably n averages from about 2 to about 4) and each R is the same or different and selected from hydrogen, C_{1-4} alkyl or C_{1-4} substituted alkyl (preferably R is hydrogen).

Suitable ether polycarboxylates also include cyclic compounds, particularly alicyclic compounds, such as those described in U.S. Patents 3,923,679; 3,835,163; 4,158,635; 4,120,874 and 4,102,903, all of which are incorporated herein by reference.

Preferred amongst those cyclic compounds are dipicolinic acid and chelidanic acid.

Also suitable polycarboxylates for use herein are mellitic acid, succinic acid, polymaleic acid, benzene 1,3,5-tricarboxylic acid, benzene pentacarboxylic acid, and carboxymethyloxysuccinic acid, and soluble salts thereof.

Still suitable carboxylate builders herein include the carboxylated carbohydrates disclosed in U.S. Patent 3,723,322, Diehl, issued March 28, 1973, incorporated herein by reference.

Other suitable carboxylates for use herein, but which are less preferred because they do not meet the above criteria are alkali metal, ammonium and substituted ammonium salts of polyacetic acids. Examples of polyacetic acid builder salts are sodium, potassium, lithium, ammonium and substituted ammonium salts of ethylenediamine, tetraacetic acid and nitrilotriacetic acid.

Other suitable, but less preferred polycarboxylates are those also known as alkyliminoacetic builders such as methyl imino diacetic acid, alanine diacetic acid, methyl glycine diacetic acid, hydroxy propylene imino diacetic acid and other alkyl imino acetic acid builders.

Also suitable in the compositions of the present invention are the 3,3-dicarboxy-4-oxa-1,6-hexanediotes and the related compounds disclosed in U.S. Patent 4,566,984, Bush, issued January 28, 1986, incorporated herein by reference. Useful succinic acid builders (succinate builders) include the C5-C20 alkyl succinic acids and salts thereof. A particularly preferred compound of this type is dodecenylsuccinic acid. Alkyl succinic acids typically are of the general formula R-CH(COOH)CH_2(COOH) i.e., derivatives of succinic acid, wherein R is hydrocarbon, e.g., C_{10}-C_{20} alkyl or alkenyl, preferably C_{12}-C_{16} or wherein R may be substituted with hydroxyl, sulfo, sulfoxy or sulfone substituents, all as described in the above-mentioned patents.

Other suitable succinate builders include imino disuccinate, oxodisuccinates, tartrate monosuccinate, tartratedisuccinates and polysuccinates.

The succinate builders are preferably used in the form of their water-soluble salts, including the sodium, potassium, ammonium and alkanolammonium salts.

Specific examples of succinate builders include : laurylsuccinate, myristylsuccinate, palmitylsuccinate, 2-dodecenylsuccinate (preferred), 2-pentadecenylsuccinate, and the like. Laurylsuccinates are the preferred builders of this group, and are described in European Patent Application 86200690.5/0 200 263, published November 5, 1986.

Examples of useful builders also include sodium and potassium carboxymethyloxymalonate, carboxymethyloxysuccinate, cis-cyclo-hexanehexacarboxylate, cis-cyclopentane-tetracarboxylate, water-soluble polyacrylates and the copolymers of maleic anhydride with vinyl methyl ether or ethylene.

Other suitable polycarboxylates are the polyacetal carboxylates disclosed in U.S. Patent 4,144,226, Crutchfield et al., issued March 13, 1979, incorporated herein by reference. These polyacetal carboxylates can be prepared by bringing together, under polymerisation conditions, an ester of glyoxylic acid and a polymerisation initiator. The resulting polyacetal carboxylate ester is then attached to chemically stable end groups to stabilise the polyacetal carboxylate against rapid depolymerization in alkaline solution, converted to the corresponding salt, and added to a surfactant.

Polycarboxylate builders are also disclosed in U.S. Patent 3,308,067, Diehl, issued March 7, 1967, incorporated herein by reference. Such materials include the water-soluble salts of homo- and copolymers of aliphatic carboxylic acids such as maleic acid, itaconic acid, mesaconic acid, fumaric acid, aconitic acid, citraconic acid and methylenemalonic acid.

Suitable polyphosphonates for use herein are the alkali metal, ammonium and alkanolammonium salts of polyphosphates (exemplified by the tripolyphosphates, pyrophosphates, and glassy polymeric meta-phosphates), phosphonates. The most preferred builder for use herein is citrate.

Divalent ions

The compositions according to the present invention may further comprise a divalent ion, or mixtures thereof. All divalent ions known to those skilled in the art may be used herein. Preferred divalent ions to be used herein are calcium, zinc, cadmium, nickel, copper, cobalt, zirconium, chromium and/or magnesium and more preferred are calcium, zinc and/or magnesium. Said divalent ions may be added in the form of salts for example as chloride, acetate, sulphate, formate and/or nitrate or as a complex metal salt. For example, calcium may be added in the form of calcium chloride, magnesium as magnesium acetate or magnesium sulphate and zinc as zinc chloride. Typically such ions may be present at a level up to 3 %, preferably from 0.001% to 1% by weight of the total composition.

Bleaching components

The liquid compositions herein may also comprise a bleaching component. Any bleach known to those skilled in the art may be suitable to be used herein including any peroxygen bleach as well as a chlorine releasing component.

Suitable peroxygen bleaches for use herein include hydrogen peroxide or sources thereof. As used herein a source of hydrogen peroxide refers to any compound which produces active oxygen when said compound is in contact with water. Suitable water-soluble sources of hydrogen peroxide for use herein include percarbonates, preformed percarboxylic acids, persilicates, persulphates, perborates, organic and inorganic peroxides and/or hydroperoxides.

Suitable chlorine releasing component for use herein is an alkali metal hypochlorite. Advantageously, the composition of the invention are stable in presence of this bleaching component. Although alkali metal hypochlorites are preferred, other hypochlorite compounds may also be used herein and can be selected from calcium and magnesium hypochlorite. A preferred alkali metal hypochlorite for use herein is sodium hypochlorite.

Bleach activators

The compositions of the present invention that comprise a peroxygen bleach may further comprise a bleach activator or mixtures thereof. By "bleach activator", it is meant herein a compound which reacts with peroxygen bleach like hydrogen peroxide to form a peracid. The peracid thus formed constitutes the activated bleach. Suitable bleach activators to be used herein include those belonging to the class of esters, amides, imides, or anhydrides. Examples of suitable compounds of this type are disclosed in British Patent GB 1 586 769 and GB 2 143 231 and a method for their formation into a prilled form is described in European Published Patent Application EP-A-62 523. Suitable examples of such compounds to be used herein are tetracetyl ethylene diamine (TAED), sodium 3,5,5 trimethyl hexanoyloxybenzene sulphonate, diperoxy dodecanoic acid as described for instance in US 4 818 425 and nonylamide of peroxyadipic acid as described for instance in US 4 259 201 and n-nonanoyloxybenzenesulphonate (NOBS). Also suitable are N-acyl caprolactams selected from the group consisting of substituted or unsubstituted benzoyl caprolactam, octanoyl caprolactam, nonanoyl caprolactam, hexanoyl caprolactam, decanoyl caprolactam, undecenoyl caprolactam, formyl caprolactam, acetyl caprolactam, propanoyl caprolactam, butanoyl caprolactam pentanoyl caprolactam or mixtures thereof. A particular family of bleach activators of interest was disclosed in EP 624 154, and particularly preferred in that family is acetyl triethyl citrate (ATC). Acetyl triethyl citrate has the advantage that it is environmental-friendly as it eventually degrades into citric acid and alcohol. Furthermore, acetyl triethyl

citrate has a good hydrolytical stability in the product upon storage and it is an efficient bleach activator. Finally, it provides good building capacity to the composition.

Packaging form of the wet wipes

The wet wipes according to the present invention may be packaged in a box, preferably in a plastic box.

In a preferred embodiment according to the present invention, the wet wipes are provided in a stacked configuration which may comprise any number of wipes. Typically, the stack comprises from 2 to 150, more preferably from 5 to 100, most preferably from 10 to 60 wipes. Moreover the wipes may be provided in any configuration folded or unfolded. Most preferably, the wipes are stacked in a folded configuration.

Process of cleaning a surface

In a preferred embodiment, the present invention encompasses a process of cleaning a surface, preferably a hard surface, comprising the step of contacting, preferably wiping, said surface with a wet wipe as described herein.

Preferably, In a preferred embodiment of the present application, said process comprises the steps of contacting parts of said surface, more preferably soiled parts of said surface, with said wet wipe

In another preferred embodiment said process, after contacting said surface with said wet wipe, further comprises the step of imparting mechanical action to said surface using said wet wipe. By "mechanical action" it is meant herein, agitation of the wet wipe on the surface, as for example rubbing the surface using the wet wipe.

By "hard-surfaces", it is meant herein any kind of surfaces typically found in houses like kitchens, bathrooms, or in car interiors or exteriors, e.g., floors, walls, tiles, windows, sinks, showers, shower plastified curtains, wash basins, WCs, dishes, fixtures and fittings and the like made of different materials like ceramic, vinyl, no-wax vinyl, linoleum, melamine, glass, any plastics, plastified wood, metal or any painted or varnished or sealed surface and the like. Hard-surfaces also include household appliances including, but not limited to, refrigerators, freezers, washing machines, automatic dryers, ovens, microwave ovens, dishwashers and so on.

Examples

The following examples will further illustrate the present invention. The compositions are made by combining the listed ingredients in the listed proportions (weight % unless otherwise specified). The following Examples are meant to exemplify compositions used in a process according to the present invention but are not necessarily used to limit or otherwise define the scope of the present invention.

	A	B	C	D	E	F
Nonionic surfactants						
C 9-11 EO5	0.30	-	0.19	0.7	-	1.0
C12,14 EO5	0.30	0.5	0.19	-	-	1.0
C11 EO5	-	-	-	-	0.7	-
AO21	-	0.5	0.15	-	-	0.8
Anionic surfactants						
NaPS	-	0.12	-	-		0.20
NaLAS	0.08	-	0.06	-	-	-
NaCS	-	-	-	-	0.3	-
Isalchem® AS	-	-	-	0.10	0.05	-
Buffer						
Na_2CO_3	0.06	0.13	0.1	0.1	0.05	0.5
Citric	0.5	0.56	0.75	0.3	1.5	1.0
Caustic	0.3	0.33	0.4	0.17	0.8	0.5

Suds control						
Fatty Acid	0.02	0.1	0.2	0.10	0.001	0.055
Silicone	0.003	0.003	0.009	0.023	0.033	0.005
2-alkyl alkanol						
Isofol 12®	0.10	-	0.13	0.15	-	0.2
Isofol 16®	-	0.15	-	-	0.12	-
Solvents						
EtOH	12.0	10.0	10.0	-	10.0	20.0
n-BP	4.0	2.0	0.6	1.5	1.0	2.0
BDGE	-	1.0	0.6	-	1.0	2.0
IPA	-	-	-	10.0	-	-
Minors and water	------	------	up	to	100%	------
pH	8.6	7.4	8.7	8.6	9.0	8.6

Isofol 12® is 2-butyl octanol commercially available from Condea.

Isofol 16® is 2-hexyl decanol commercially available from Condea.

C8-AS is octyl sulphate available from Albright and Wilson, under the tradename Empimin® LV 33.

AO21 is a C12-14 EO21 alcohol ethoxylate.

Isalchem® AS is a branched alcohol alkyl sulphate commercially available from Enichem.

C 9-11 EO5 is a C 9-11 EO5 nonionic surfactant commercially available from ICI or Shell.

C12,14 EO5 is a C12, 14 EO5 nonionic surfactant commercially available from Huls, A&W or Hoechst.

C11 EO5 is a C11 EO5 nonionic surfactant.

NaPS is Sodium Paraffin sulphonate commercially available from Huls or Hoechst.

NaLAS is Sodium Linear Alkylbenzene sulphonate commercially available from A&W.

NaCS is Sodium Cumene sulphonate commercially available from A&W.

Isalchem AS® is a C_{12-13} sulphate surfactant commercially available from Enichem.

Silicone is commercially available from Dow Corning.

n-BP is normal butoxy propanol commercially available from Dow Chemicals.

BDGE is normal buthyl diglycolether commercially available from Union Carbide or BASF.

Ethanol is commercially available from Condea.

IPA is isopropanol.

These cleaning compositions are incorporated on a wet wipe as disclosed herein and provide wetting capabilities resulting in a cleaning benefit and/or a streak-free cleaning benefit whist showing an evaporation benefit.

WHAT IS CLAIMED IS:

1. A wet wipe incorporating a cleaning composition comprising a 2-alkyl alkanol and a solvent or a mixture thereof.

2. A wet wipe according claim 1, wherein said 2-alkyl alkanol has an alkyl chain comprising from 6 to 16 carbon atoms and a terminal hydroxy group, said alkyl chain being substituted in the α position by an alkyl chain comprising from 1 to 10 carbon atoms.

3. A wet wipe according to any of the preceding claims, wherein said 2-alkyl alkanol is selected from the group consisting of 2-butyl octanol, 2-hexyl decanol, and a mixture thereof.

4. A wet wipe according to any of the preceding claims, wherein said cleaning composition comprises up to 5% by weight of the total composition of said 2-alkyl alkanol.

5. A wet wipe according to any of the preceding claims, wherein said solvent is selected from the group consisting of : ethers and diethers having from 4 to 14 carbon atoms, preferably from 6 to 12 carbon atoms, and more preferably from 8 to 10 carbon atoms; glycols or alkoxylated glycols; alkoxylated aromatic alcohols; aromatic alcohols; alkoxylated aliphatic alcohols; aliphatic alcohols; C_8-C_{14} alkyl and cycloalkyl hydrocarbons and halohydrocarbons; C_6-C_{16} glycol ethers; terpenes; and mixtures thereof.

6. A wet wipe according to any of the preceding claims, wherein said solvent is selected from the group consisting of butoxy propoxy propanol, butyl diglycol ether, benzyl alcohol, hexanediols, butoxypropanol, ethanol, methanol, isopropanol and mixtures thereof.

7. A wet wipe according to any of the preceding claims, wherein said cleaning composition comprises up to 30% by weight of the total composition of said solvent.

8. A wet wipe according to any of the preceding claims, wherein said composition additionally comprises a surfactant.

9. A wet wipe according to claim 8, wherein said surfactant is present in said cleaning composition in amounts of from 0.01% to 50% by weight of the total composition.

10. A wet wipe according to any claims 8 or 9, wherein said surfactant is selected from the group consisting of nonionic surfactants, anionic surfactants and mixtures thereof.

11. A wet wipe according to any of the preceding claims, wherein said composition additionally comprises a perfume.

12. A wet wipe according to any of the preceding claims, wherein said wet wipe further comprises an antifoaming agent.

13. A wet wipe according to claim 12, wherein said antifoaming agent is comprised in the cleaning composition.

14. A wet wipe according to any claims 12 or 13, wherein said antifoaming agent comprises a silicone.

15. A wet wipe according to any claims 12 to 14, wherein said antifoaming agent further comprises a fatty acid and/or a capped alkoxylated nonionic surfactant.

16. A wet wipe according to any claims 12 to 15, wherein the amount of said antifoaming agent used expressed in weight percent is from 0.01% to 5% of the weight of the dry substrate material.

17. A process of cleaning a surface, preferably a hard surface, comprising the step of contacting said surface with a wet wipe according to any of the preceding claims.

18. The use of a 2-alkyl alkanol in a cleaning composition comprising a solvent wherein said cleaning composition is incorporated onto or into a wet wipe, whereby a cleaning performance benefit and/or a streak-free cleaning benefit is provided.

INTERNATIONAL SEARCH REPORT

Int tional Application No
PCT/US 00/17008

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C11D17/04 C11D3/43

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C11D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE WPI Week 199335 Derwent Publications Ltd., London, GB; AN 1993-278495 XP002121289 & JP 05 194999 A (SANYO CHEM. IND.), 3 August 1993 (1993-08-03) abstract	1,3,8, 10,17,18
A	US 4 965 000 A (DAVID C. POTTS ET AL.) 23 October 1990 (1990-10-23) column 4, line 2 - paragraph 3	1
A	US 4 666 621 A (W.A. CLARK ET AL.) 19 May 1987 (1987-05-19) cited in the application column 7, paragraph 5; claims 1,4,11	1,6,8, 17,18

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 September 2000	14/09/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Loiselet-Taisne, S

1

Information on patent family members

Int[illegible]ional Application No
PCT/US 00/17008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 5194999 A	03-08-1993	NONE	
US 4965000 A	23-10-1990	NONE	
US 4666621 A	19-05-1987	AU 587535 B	17-08-1989
		AU 7019987 A	08-10-1987
		CA 1281250 A	12-03-1991
		DE 3766273 D	03-01-1991
		EP 0240009 A	07-10-1987